WHAT IS CLAIMED IS:

1. A solid-state image pickup device comprising:

a light receiving sensor portion which is provided in a surface layer portion of a substrate and performs photoelectric conversion;

an in-layer lens which is provided in a layer above said light receiving sensor portion and converges incident light to said light receiving sensor portion; and

a color filter which is provided through an antireflection film on said in-layer lens, wherein said antireflection film is formed of material having a refractive index which is an intermediate value between the refractive index of said in-layer lens and the refractive index of said color filter.

2. The solid-state image pickup device as claimed in claim 1, further including a charge transfer portion which is provided in the surface layer portion of said substrate and transfers signal charge read out from said light receiving sensor portion, and a transfer electrode which is provided through an insulation film on said substrate so as to be located substantially just above said charge transfer portion.

3. The solid-state image pickup device as claimed in claim 1, further including an on-chip lens at the upper side of said color filter layer.

4. The solid-state image pickup device as claimed in claim 1, further including an interlayer film which is provided

below said in-layer lens through another antireflection film below said in-layer lens, wherein said the other antireflection film is formed of material having a refractive index which is an intermediate value between the refractive index of said in-layer lens and the refractive index of said interlayer film.

5. A solid-state image pickup device including:

a light receiving sensor portion which is provided in a surface layer portion of a substrate and performs photoelectric conversion;

an interlayer film formed on said light receiving sensor portion; and

an in-layer lens which is provided on said interlayer film and converges incident light through an antireflection film to said light receiving sensor portion, wherein said antireflection film is formed of material having a refractive index which is an intermediate value between the refractive index of said in-layer lens and the refractive index of said interlayer film.

6. The solid-state image pickup device as claimed in claim 5, further including a charge transfer portion which is provided in the surface layer portion of said substrate and transfers signal charge read out from said light receiving sensor portion, and a transfer electrode which is provided through an insulation film on said substrate so as to be located substantially just above said charge transfer portion.

7. The solid-state image pickup device as claimed in claim 5, further including a color filter layer disposed above said in-layer lens.

8. The solid-state image pickup device as claimed in claim 7, further including an on-chip lens disposed above said in-layer lens.

9. The solid-state image pickup device as claimed in claim 5, wherein said color filter layer is provided through another antireflection film on said in-layer lens, and said the other antireflection film is formed of material having a refractive index which is an intermediate value between the refractive index of said in-layer lens and the refractive index of said color filter layer.

10. A method of manufacturing a solid-state image pickup device comprising the steps of:

forming in a surface layer portion of a substrate a light receiving sensor portion for performing photoelectric conversion, a charge transfer portion for transferring signal charge read-out from said light receiving sensor portion, and forming a transfer electrode through an insulation film substantially just above said charge transfer portion on said substrate;

depositing an interlayer film so as to cover said transfer electrode;

conducting a heat treatment under a predetermined

condition to form a recess portion; and

forming an antireflection film along the upper portion of said recess portion, wherein said antireflection film is formed of material having a refractive index which is an intermediate value between the refractive index of an in-layer lens and the refractive index of said interlayer film, and wherein said in-layer lens is formed on said antireflection film so that the lens material is filled in said recess portion, and then the surface thereof is flattened.

11. The method as claimed in claim 10, wherein a color filter layer is formed above said in-layer lens.

12. The method as claimed in claim 10, wherein an on-chip lens is formed above said in-layer lens.

13. The method as claimed in claim 10, further comprising the steps of forming another antireflection film on said in-layer lens, and forming a color filter layer on the other antireflection film, wherein said antireflection film is formed of material having a refractive index which is an intermediate value between the refractive index of said in-layer lens and the refractive index of said color filter layer.